FISH HAVEN PIPELINE COMPANY (PWS 6040011)
SOURCE WATER ASSESSMENT FINAL REPORT

October 22, 2002

State of Idaho
Department of Environmental Quality

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Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This assessment is based on a land use inventory of the designated assessment area and sensitivity factors associated with the well and spring and aquifer characteristics.

This report, *Source Water Assessment for Fish Haven Pipeline Company, Fish Haven, Idaho,* describes the public drinking water system (PWS), the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The Fish Haven Pipeline Company (PWS #6040011) is a community drinking water system that consists of one well, one spring, and two storage reservoirs. The well is located west of Highway 89 and south of the Fish Haven community. The spring is located in the foothills of the mountains to the west of Fish Haven. The system currently serves approximately 250 persons through 179 connections.

The potential contaminant source within the well's delineation capture zone includes the transportation corridor, Highway 89. There were no potential contaminant sources identified within the spring's delineation. Another contaminant source identified that may contribute to the overall vulnerability of the well water was the amount of agricultural land within the delineation. The predominant land use within the spring's delineation is undeveloped rangeland. A complete list of potential contaminant sources is provided with this assessment (Table 1).

For the assessment, a review of laboratory tests was conducted using the Idaho Drinking Water Information Management System (DWIMS) and the State Drinking Water Information System (SDWIS). Total coliform bacteria were detected at various locations in the distribution system. The inorganic chemicals (IOCs) barium, calcium, fluoride, and nitrate have been detected in the drinking water, but at levels below the maximum contaminant level (MCL) for each chemical. The volatile organic chemicals (VOCs) bromodichloromethane, chlorodibromomethane, bromoform, and chloroform were detected in October 1998. Each of these four compounds is a disinfection product related to chlorine. No synthetic organic chemicals (SOCs) have been detected in the drinking water.

Final susceptibility scores are derived from equally weighting system construction scores, hydrologic sensitivity scores, and potential contaminant/land use scores. Therefore, a low rating in one or two categories coupled with a higher rating in other categories results in a final rating of low, moderate, or high susceptibility. With the potential contaminants associated with most urban and heavily agricultural areas, the best score a well can get is moderate. Potential contaminants are divided into four categories, IOCs (i.e. nitrates, arsenic), VOCs (i.e. petroleum products), SOCs (i.e. pesticides), and microbial contaminants (i.e. bacteria). As different wells can be subject to various contamination settings, separate scores are given for each type of contaminant.

In terms of total susceptibility, Well #1 rated high for IOCs, VOCs, SOCs, and microbials. The high scores are due to pastureland within the 50-foot setback of the well and the presence of an open water well on the well lot that has not been filled and properly abandoned. An open well in close proximity to Well #1 can contribute to the pollution of the aquifer from which the well draws water. System construction rated moderate and hydrologic sensitivity rated high. Potential contaminant inventory and land use scores rated moderate for IOCs, VOCs, SOCs, and low for microbials.

In terms of total susceptibility, the spring rated low for IOCs, VOCs, SOCs, and microbials. System construction rated moderate and potential contaminant inventory and land use scores rated low for IOCs, VOCs, SOCs, and microbials.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

For the Fish Haven Pipeline Company, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system's components and its capacity). Also, it is important that the disinfection process be maintained in a way to protect the drinking water from VOC by-products, a result of the chlorination disinfection. Though water cannot be totally free of by-products when disinfection is used, they can be reduced by treatment modifications. In 1983, EPA identified some technologies, treatment techniques, and plant modifications that water systems could use to reduce the amount of disinfection by-products produced. Disinfection by-product control strategies can be accessed at www.epa.gov/safewater. As land uses within most of the source water assessment areas are outside the direct jurisdiction of Fish Haven Pipeline Company, collaboration and partnerships with state and local agencies and industry groups should be established and are critical to success.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan as the delineations are near urban and residential land uses areas. Public education topics could include proper lawn and garden care practices, household hazardous waste disposal methods, proper care and maintenance of septic systems, and the importance of water conservation to name but a few. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. Since a transportation corridor (Highway 89) is near the well's delineation, the Department of Transportation should be involved in protection activities. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Bear Lake County Soil and Water Conservation District, and the Natural Resources Conservation Service.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (e.g. zoning, permitting) or non-regulatory in nature (e.g. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Pocatello Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR FISH HAVEN PIPELINE COMPANY, FISH HAVEN, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this assessment means.** Maps showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are included. The list of significant potential contaminant source categories and their rankings used to develop the assessment also is included.

Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the EPA to assess over 2,900 public drinking water sources in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area, sensitivity factors associated with the well and spring and aquifer characteristics. All assessments must be completed by May of 2003. The resources and time available to accomplish assessments are limited. Therefore, an in-depth, site-specific investigation to identify each significant potential source of contamination for every public water supply system is not possible. **This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the public water system (PWS).**

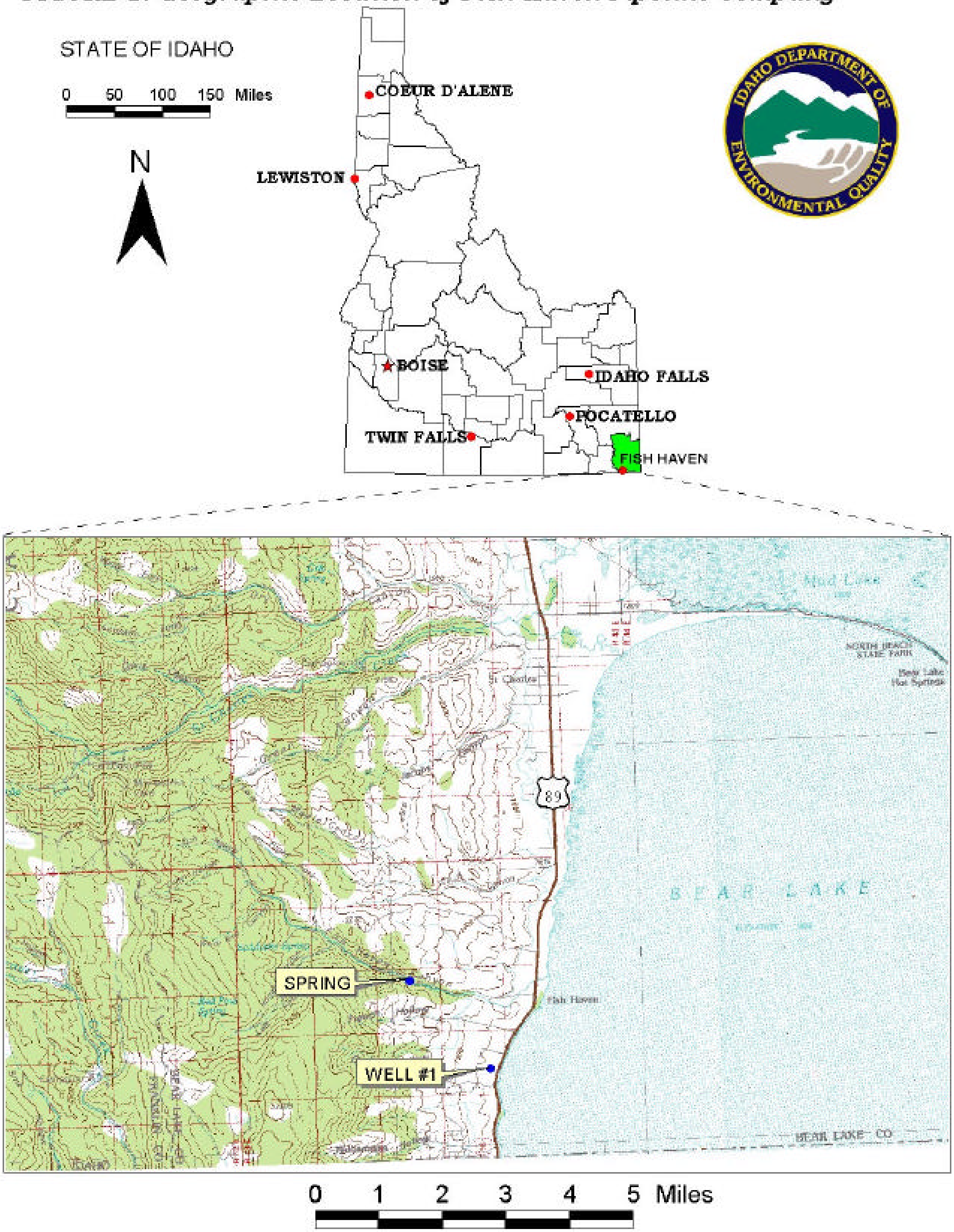
The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. DEQ recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a drinking water protection program should be determined by the local community based on its own needs and limitations. Wellhead or drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

The Fish Haven Pipeline Company (PWS #6040011) drinking water system is located in Bear Lake County (Figure 1). The system consists of one well, one spring, and two storage reservoirs that provide drinking water to approximately 250 persons through 179 connections. The inorganic chemicals (IOCs) barium, calcium, fluoride, and nitrate have been detected in the drinking water, but at levels below the maximum contaminant level (MCL) for each chemical. The volatile organic chemicals (VOCs) bromodichloromethane, chlorodibromomethane, bromoform, and chloroform were detected in October 1998. Each of these four compounds is a disinfection product related to chlorine. No synthetic organic chemicals (SOCs) have been detected in the drinking water.

FIGURE 1. Geographic Location of Fish Haven Pipeline Company



Defining the Zones of Contribution – Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel (TOT) zones (zones indicating the number of years necessary for a particle of water to reach a pumping well) for water in the aquifer. Washington Group International (WGI) was contracted by DEQ to define the public water system's zones of contribution. WGI used a conceptual computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) TOT for water associated with the Bear River - Dingle Swamp hydrologic province in the vicinity of the Fish Haven Pipeline Company. The computer model used site specific data, assimilated by WGI from a variety of sources including operator records, well logs (when available) and hydrogeologic reports. A summary of the hydrogeologic information from the WGI is provided below.

Hydrogeologic Conceptual Model

The Bear River originates in the Uinta Mountains of northern Utah and winds its way through over 500 miles of Wyoming, Idaho, and Utah to terminate in a freshwater bay of the Great Salt Lake just 90 miles west of its source (Dion, 1969, p. 6). The Bear River enters Idaho near Border, Wyoming and flows along the north edge of the Bear River Plateau. Flowing north through the Bear River – Dingle Swamp hydrologic province, it passes into the Soda Springs hydrologic province east of the Bear River Range. Upon entering the Gem Valley– Gentile Valley hydrologic province, it swings south. Now west of the Bear River Range, the river passes through the Oneida Narrows into the Cache Valley hydrologic province. Over most of its course through Idaho, the Bear River is gaining and in direct hydraulic communication with the major aquifer systems of the four hydrologic provinces. The exception is a small reach between the cities of Alexander and Grace where it is generally losing and is perched over the regional fractured basalt aquifer (Dion, 1969, p. 30).

Ground water in the Bear River Basin is found in Holocene alluvium, Pleistocene basalt, and rocks of the "Pliocene (?)" [sic] Salt Lake Formation, pre-Tertiary undifferentiated bedrock, and possibly the "Eocene (?)" [sic] Wasatch Formation (Dion, 1969, pp. 15 and 16). Rocks of the Salt Lake Formation, which include freshwater limestone, tuffaceous sandstone, rhyolite tuff and poorly-consolidated conglomerate, outcrop along the major valley margins and may underlie the valley-fill alluvium (Dion, 1969, pp. 16 and 17). Many of the wells drilled into this formation do not yield water. The few wells that do produce water yield as much as 1,800 gal/min from beds of sandstone and conglomerate.

The Wasatch Formation is restricted to the Bear Lake Plateau and small areas northwest of Bear Lake (Dion, 1969, p. 17 and Figure 6). The formation is composed largely of tightly cemented conglomerate and sandstone with smaller amounts of shale, limestone, and tuff. The primary pore space is typically impermeable. Water movement may occur through joints and fractures or more permeable zones that are thought to exist along the relatively flat-lying formation (Dion, 1969, p. 17). Springs occur at the margins of the formation.

Precipitation in the basin ranges from 10 in./yr on the floor of Bear Lake Valley to over 45 in./yr on the Bear River Range (Dion, 1969, pp. Vll and 11). Applied over the entire basin, precipitation amounts to approximately 2.3 million acre-feet annually. Precipitation is also the principal source of recharge to the basin's aquifers in conjunction with spring snowmelt and runoff, irrigation seepage, and canal losses.

Natural ground water discharge is by flow to the Bear River, springs, seeps along river banks, and evapotranspiration in large marshy areas (Dion, 1969, p. VIII). Some discharge may also occur by way of underflow to the Portneuf River drainage through basalt flows at Tenmile pass and near Soda Point.

Ground water is obtained from both springs and wells in the Bear River Basin. Hundreds of springs issue primarily from fractures and solution openings in the bedrock on the margins of the basin (Dion, 1969, p. 47). Water production from wells in the four hydrologic provinces is primarily from alluvial and basalt aquifers; however, some wells tap conglomerate, sandstone, limestone and shale aquifers of the Salt Lake and possibly the Wasatch formations (Dion, 1969, p. VII).

Bear River – Dingle Swamp

The Bear River–Dingle Swamp hydrologic province occupies approximately 280 square miles in the southeast corner of Idaho. The Basin and Range physiographic province is north to south trending and is bounded on the east by the Bear Lake Plateau and on the west by the Bear River Range. These mountains are composed of pre-Tertiary undifferentiated quartzite and sedimentary rocks (Dion, 1969, p. 18).

The Bear Lake Valley is filled with alternating layers of Quaternary clay, silt, sand, and gravel. The maximum thickness is unknown, yet it may be as great as several thousand feet (Dion, 1969, p.15). The sand and gravel layers are the principal water-producing units. The valley floor ranges in elevation from 5,923 feet above mean sea level (msl) at Bear Lake to 5,914 ft msl at a gauging station on the Bear River near Bennington. The southern end of the valley is almost completely filled by Bear Lake and Dingle Swamp leaving little room for development. Annual precipitation at Montpelier averaged 14 inches from 1922 to 1966 and averages over 45 in./yr on the Bear River Range (Dion, 1969, pp. 10-11).

The primary source of recharge to the valley-fill aquifer is from stream flow over alluvium near the valley margins (Dion, 1969, p. 18). Water issuing from older sedimentary rock at the bedrock/valley-fill contact also provides significant recharge to the valley fill. Precipitation on the valley floor, canal leakage, and applied irrigation water are other sources of aquifer recharge.

Natural discharge of ground water occurs as river gains along the Bear River and as evapotranspiration from Dingle Swamp where the water table is at land surface. Groundwater flow direction is to the Bear River (Dion, 1969, Figure 7). The valley-fill aquifer is generally unconfined, although perched and artesian conditions are known to occur. The alluvial aquifer is hydraulically connected to the Bear River over most of its length in the valley (Dion, 1969, p. 25).

Estimates of hydraulic conductivity are based on analysis of specific capacity data presented by Dion (1969, Table 7) and in PWS well driller's logs. Estimates range from 13 to 373 ft/day, with a geometric mean of 115 ft/day.

Spring Delineation

Delineation of the drinking water protection area for a spring involves special consideration. Hydrogeologic setting is foremost among the factors that control the shape and extent of the capture zone. A spring resulting from the presence of a high permeability fracture extending to great depth will have a much different capture zone than a depression spring formed where the ground surface intersects the water table in a unconsolidated aquifer.

The topographic method was chosen for springs that 1) are located within relatively small drainage basins with easily definable divides, 2) have an average annual discharge that can be reasonably supplied by an average annual precipitation in the drainage, and 3) have characteristics of a shallow system such as seasonal variations in discharge and temperature. This method was used to delineate the capture zone for the Fish Haven Pipeline Company spring.

Topographic maps (1:24,000 scale) were examined to identify the topographic divides bounding the drainage basins surrounding the Fish Haven spring. The assumption was made that ground water divides, which represent hydrologic boundaries to shallow ground water flow, are coincident with the topographic divides. Perennial streams or other surface water bodies that may infer the presence of hydrologic boundaries were identified.

Surface geologic maps were also used to identify low permeability lithologic units that may form ground water flow boundaries and to infer the extent of lithologic units that provide water to springs. Calculating the amount of recharge needed to produce the average reported spring discharge checked the reasonableness of a topographic delineation. The required recharge was then compared to the average yearly precipitation in the area surrounding the spring.

The delineated source water assessment area for the Fish Haven Pipeline Company well can best be described as a west-northwest trending lobe approximately 1200 feet long and 2000 feet wide (Figure 2). The spring delineation (Figure 3) can best be described as the topographic drainage up gradient of the spring box. The source area is 514 acres and includes a 100-foot buffer that was added downgradient of the spring to provide an additional factor of safety. The actual data used by WGI in determining the source water assessment delineation areas are available from DEQ upon request.

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act. Furthermore, these sources have a sufficient likelihood of releasing such contaminants into the environment at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. Field surveys conducted by DEQ and reviews of available databases identified Highway 89 as a potential contaminant source within the well's capture zone.

It is important to understand that a release may never occur from a potential source of contamination provided best management practices are being used. Many potential sources of contamination are regulated at the federal level, state level, or both, to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the <u>potential</u> for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, including educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

Contaminant Source Inventory Process

A two-phased contaminant inventory of the study area was conducted in May and June 2002. The first phase involved identifying and documenting potential contaminant sources within the Fish Haven Pipeline Company source water assessment areas through the use of computer databases and Geographic Information System (GIS) maps developed by DEQ. The second, or enhanced, phase of the contaminant inventory involved contacting the operator to identify and add any additional potential sources in the delineated areas. This task was undertaken with the assistance of Mr. Henry Howell. At the time of the enhanced inventory, no additional potential contaminant sources were found within the delineated source water area. Maps with the well and spring locations, delineated areas and potential contaminant sources are provided with this report (Figure 2 and Figure 3). Each potential contaminant source has been given a unique site number that references tabular information associated with the public water sources.

Table 1. Fish Haven Pipeline Company, Well #1, Potential Contaminant Inventory

Site #	Source Description[1]	TOT Zone[2] (years)	Source of Information	Potential Contaminants[3]
	Highway 89	3-6; 6-10	GIS Map	IOC, VOC, SOC

[2] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead
[3] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

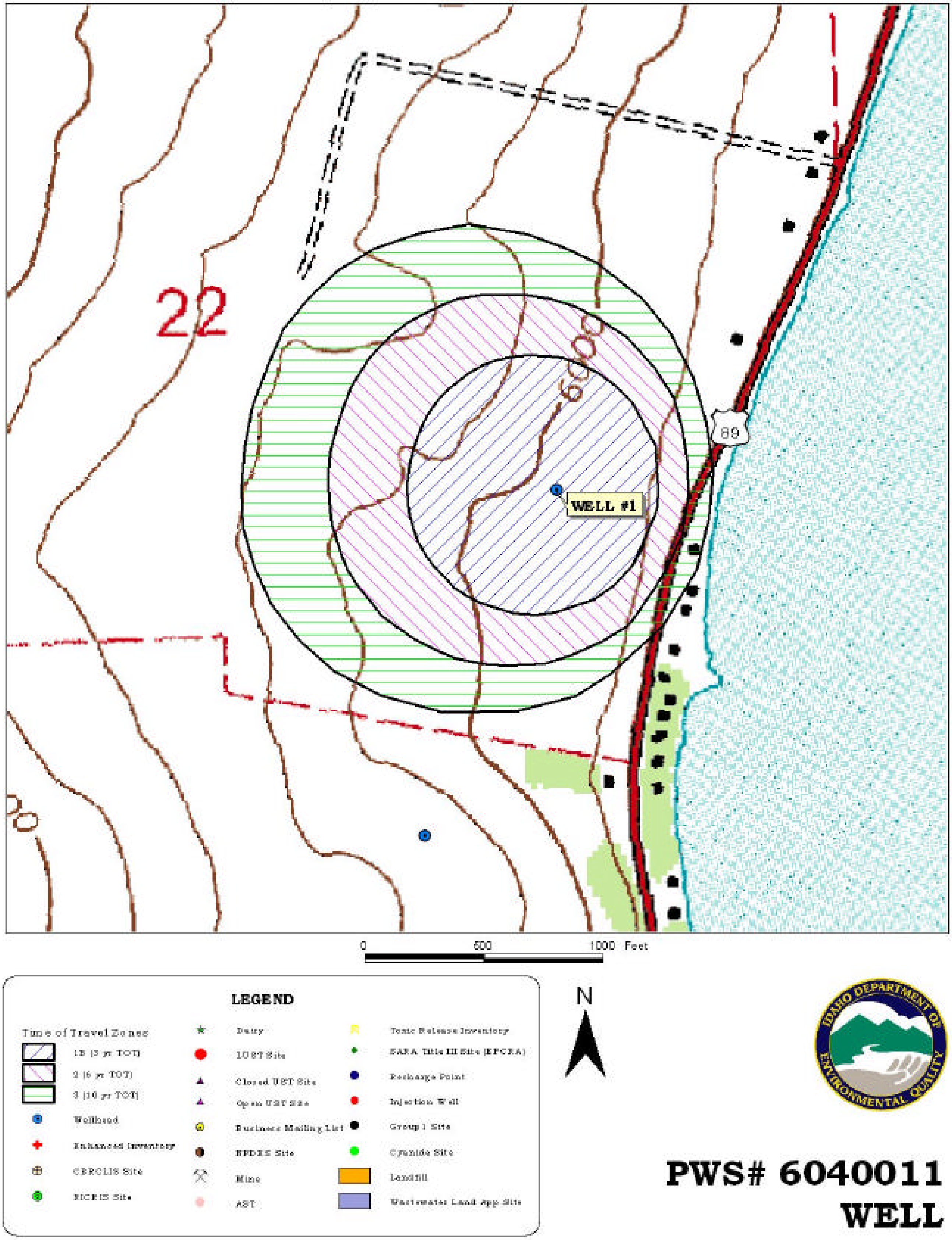
Section 3. Susceptibility Analyses

The well's and spring's susceptibility to contamination were ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics (for the well only), system construction, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each source is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Attachment A contains the susceptibility analysis worksheets. The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

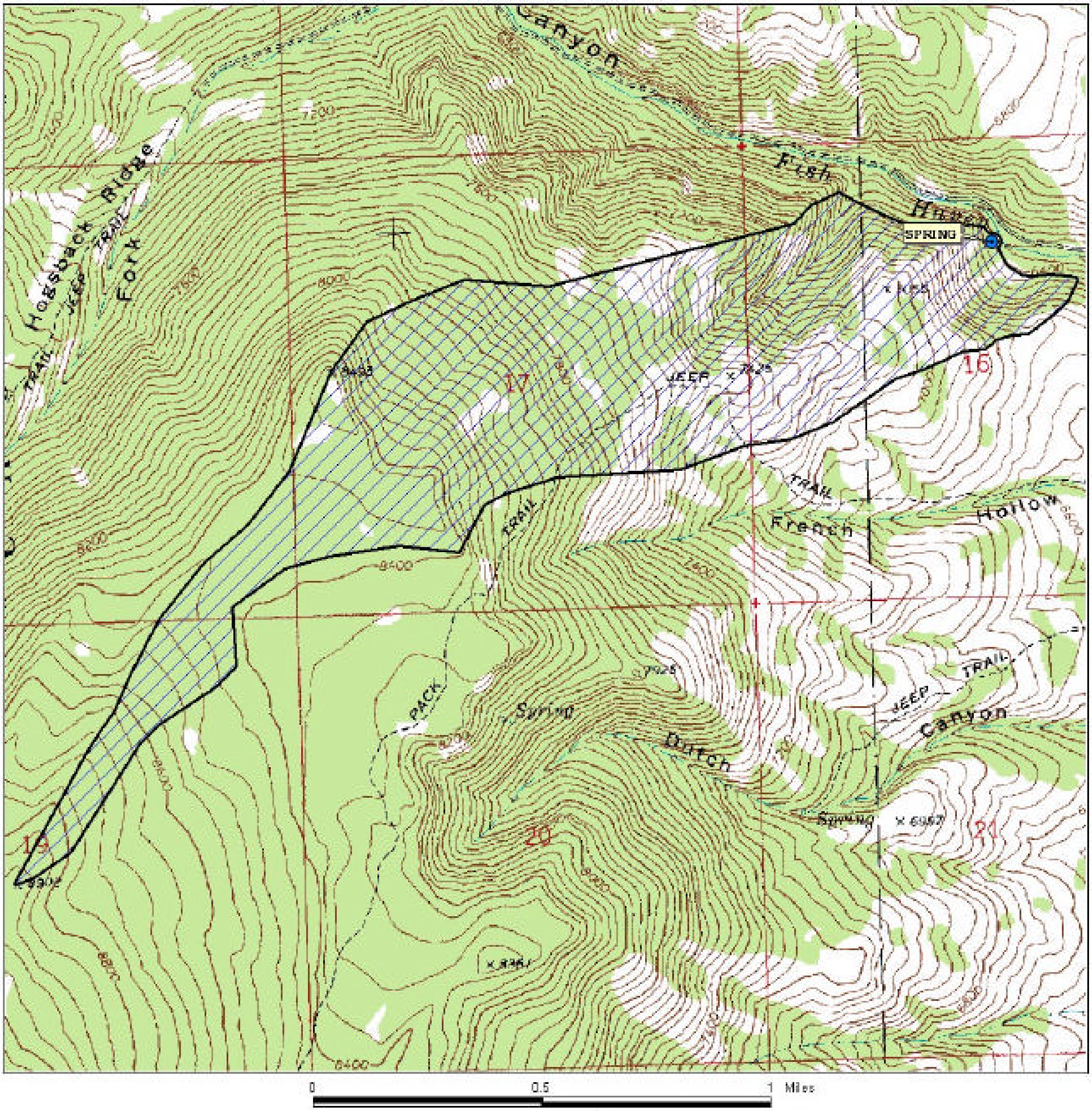
The hydrologic sensitivity of a well is dependent upon four factors: These factors are surface soil composition, the material in the vadose zone (between the land surface and the water table), the depth to first ground water, and the presence of a 50-foot thick fine-grained zone (aquitard) above the producing zone of the well. Slowly draining soils such as silt and clay typically are more protective of ground water than coarse-grained soils such as sand and gravel. Similarly, fine-grained sediments in the subsurface and a water depth of more than 300 feet protect the ground water from contamination.

FIGURE 2. Fish Haven Pipeline Company Delineation Map and Potential Contaminant Source Locations



PWS# 6040011
WELL

FIGURE 3. Fish Haven Pipeline Company Delineation Map and Potential Contaminant Source Locations



PWS# 6040011
SPRING

Hydrologic sensitivity was rated high for Well #1. Regional soils classification, as defined by the National Resource Conservation Service (NRCS), show that moderate to well drained soil classes exist within the delineation. Soils that have poor to moderate drainage characteristics have better filtration capabilities than faster draining soils. There was insufficient well log information to evaluate the vadose zone composition, the depth to first ground water, and whether there is at least 50 feet of cumulative thickness above the producing zone of low permeability material that helps to reduce the downward movement of contaminants.

Hydrologic sensitivity is not part of a spring's scoring.

Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system is less vulnerable to contamination. For example, if the well casing and annular seal both extend into a low permeability unit, then the possibility of contamination is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have better buffering capacity. If the wellhead and surface seal are maintained to standards, as outlined in sanitary surveys, then contamination down the well bore is less likely. If the well is protected from surface flooding and is outside the 100-year floodplain, then contamination from surface events is reduced.

The system construction score rated moderate for the well. According to the operator, the well was drilled in 1975. Furthermore, the operator reports the well has an 8-inch diameter casing that extends 100 feet below ground surface (bgs). Inside the 8-inch casing is a 6-inch diameter casing that extends 320 feet bgs. The operator states there is a two-foot deep water-bearing zone at the bottom of the 6-inch casing. The static water level is reported at 25 feet. The operator also reported that the well casing height was extended 6-feet above ground level in September 2002. The well vent is located at the top of the well casing. The well is located outside of the 100-year floodplain, which may decrease the chance of contaminants being drawn into the drinking water source by surface water flooding.

We were unable to assess whether the casing and annular seal extend into a low permeable unit, such as clay. If the casing and annular seal extend into a fine-grained medium, this may reduce the chances of laterally migrating contamination into the well.

The Idaho Department of Water Resources (IDWR) *Well Construction Standards Rules (1993)* require all public water systems to follow DEQ standards. IDAPA 58.01.08.550 requires that PWSs follow the *Recommended Standards for Water Works (1997)* during construction. Under current standards, all PWS wells are required to have a 50-foot buffer around the wellhead and if the well is designed to yield greater than 50 gallons per minute (gpm) a minimum of a 6-hour pump test is required. These standards are used to rate the system construction for the well by evaluating items such as condition of wellhead and surface seal, whether the casing and annular space is within consolidated material or 18 feet below the surface, the thickness of the casing, etc. If all criteria are not met, the public water source does not meet the IDWR Well Construction Standards. In our search for well construction information, we were unable to locate a well driller's log. Because the well's construction could not be accurately assessed without a well log and knowing the approximate age of the well, it is considered that the well does not meet the current IDWR Well Construction standards for a public water system. Therefore, the well received a conservative rating in terms of system construction susceptibility to contamination.

Spring Construction

Spring construction scores are determined by evaluating whether the spring has been constructed according to Idaho Code (IDAPA 58.01.08.04) and if the spring's water is exposed to any potential contaminants from the time it exits the bedrock to when it enters the distribution system. If the spring's intake structure, infiltration gallery, and housing are located and constructed in such a manner as to be permanent and protect it from all potential contaminants, is contained within a fenced area of at least 100 foot radius, and is protected from all surface water by diversions, berms, etc., then Idaho Code is being met and the score will be lower. If the spring's water comes in contact with the open atmosphere before it enters the distribution system, it receives a higher score. Likewise, if the spring's water is piped directly from the bedrock to the distribution system or is collected in a protected spring box without any contact to potential surface-related contaminants, the score is lower.

The spring rated moderate for system construction. The spring water flows directly from bedrock to a 6 foot by 6 foot concrete box which is cast against the rock. This permanent structure protects the spring water from all surface related potential contaminants. One point was assessed because it is unknown if surface water uphill of the spring is diverted away from the collection box by berms, trenches, or otherwise, and the land within 100 feet of the spring is fenced and owned/leased by the water system. The spring water does not appear to be subjected to any atmospheric potential contaminants before entering the distribution system.

Potential Contaminant Source and Land Use

The potential contaminant sources and land use within the delineated zones of water contribution are assessed to determine the well's susceptibility. When agriculture is the predominant land use in the area, this may increase the likelihood of agricultural wastewater infiltrating the ground water system. Agricultural land is counted as a source of leachable contaminants and points are assigned to this rating based on the percentage of agricultural land. The land use within the area surrounding the Fish Haven Pipeline Company's well is predominately agricultural, while the spring's land use is predominantly undeveloped rangeland.

In terms of potential contaminant sources, the land use susceptibility ratings are as follows. Well #1 rated moderate for IOCs, VOCs, and SOCs, and low for microbial contaminants. The spring rated low for all land use categories. The low number of potential contaminant sources within both delineations contributed to the scores, as did the large amount of agricultural land in Well #1's delineation.

Final Susceptibility Ranking

A detection above a drinking water standard MCL, any detection of a VOC or SOC at the wellhead will automatically give a high susceptibility rating to a well despite the land use of the area because a pathway for contamination already exists. Additionally, potential contaminant sources within 50 feet of a wellhead will automatically lead to a high susceptibility rating. Hydrologic sensitivity and system construction scores are heavily weighted in the final scores. Having multiple potential contaminant sources in the 0- to 3-year time of travel zone (Zone 1B) contribute greatly to the overall ranking.

Table 2. Summary of Fish Haven Pipeline Company Susceptibility Evaluation

Drinking Water Source	Susceptibility Scores[1]									
	Hydrologic Sensitivity	Potential Contaminant Inventory and Land Use				System Construction	Final Susceptibility Ranking			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Well #1	H	M	M	M	L	M	H*	H*	H*	H*
Spring	NA	L	L	L	L	M	L	L	L	L

[1]H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility,
IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical
H* = automatic high due to pasture land within the well's 50 foot sanitary setback distance and the presence of an open water well on the well lot that has not been filled and properly abandoned; NA = not applicable

Susceptibility Summary

In terms of total susceptibility, Well #1 rated high for IOCs, VOCs, SOCs, and microbials. The high ratings are due to pasture within the 50-foot sanitary setback distance of the well and the presence of an open water well on the well lot that has not been filled and properly abandoned. System construction rated moderate and hydrologic sensitivity rated high. Potential contaminant inventory and land use scores were moderate for IOCs, VOCs, SOCs, and low for microbials.

In terms of total susceptibility, the spring rated low. Spring construction rated moderate, and land use scores were low for IOCs, VOCs, SOCs, and microbials.

The IOCs fluoride, barium, calcium, and nitrate have been detected in the well water, although the reported concentrations of these chemicals were below the MCL for each chemical. The VOCs bromodichloromethane, chlorodibromomethane, bromoform, and chloroform, all disinfection byproducts associated with chlorination, were detected once in October 1998. No SOCs have been detected in the drinking water.

Section 4. Options for Drinking Water Protection

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

An effective drinking water protection program is tailored to the particular local drinking water protection area. A community with a fully developed source water protection program will incorporate many strategies. For Fish Haven Pipeline Company, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey. No potential contaminants (pesticides, paint, fuel, cleaning supplies, etc.) should be stored or applied within 50 feet of the well. Land uses within most of the source water assessment areas are outside the direct jurisdiction of the Fish Haven Pipeline Company, making collaboration and partnerships with state and local agencies, industrial and commercial groups should be established to ensure future land uses are protective of ground water quality.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan as the delineation contains some urban and residential land uses. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the U.S. EPA. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, Bear Lake Soil Conservation and Water District, and the Natural Resources Conservation Service.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (e.g. zoning, permitting) or non-regulatory in nature (e.g. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Pocatello Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

Assistance

Public water supplies and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Pocatello Regional DEQ Office (208) 236-6160

State DEQ Office (208) 373-0502

Website: http://www.deq.state.id.us

Water suppliers serving fewer than 10,000 persons may contact Ms. Melinda Harper (mlharper@idahoruralwater.com), Idaho Rural Water Association, at 208-343-7001 for assistance with drinking water protection (formerly wellhead protection) strategies.

POTENTIAL CONTAMINANT INVENTORY LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLA – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as ASuperfund≅ is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100-year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5 mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25% of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RCRA – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

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Attachment A

Fish Haven Pipeline Company
Susceptibility Analysis Worksheets

The final scores for the susceptibility analysis of the well were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)

2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.375)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

The final scores for the susceptibility analysis of the spring was determined using the following formulas:

VOC/SOC/IOC/Microbial Final Score = (Potential Contaminant/Land Use X 0.273) + System Construction

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

Ground Water Susceptibility Report — Public Water System Name: FISH HAVEN PIPELINE COMPANY — WELL #1
Public Water System Number 6040011 — 08/20/2002 12:34:27 PM

1. System Construction		SCORE
Drill Date	1975	
Driller Log Available	NO	
Sanitary Survey (if yes, indicate date of last survey)	YES	1999
Well meets IDWR construction standards	NO	1
Wellhead and surface seal maintained	YES	0
Casing and annular seal extend to low permeability unit	NO	2
Highest production 100 feet below static water level	YES	0
Well located outside the 100 year flood plain	YES	0
	Total System Construction Score	3

2. Hydrologic Sensitivity		
Soils are poorly to moderately drained	NO	2
Vadose zone composed of gravel, fractured rock or unknown	YES	1
Depth to first water > 300 feet	NO	1
Aquitard present with > 50 feet cumulative thickness	YES	2
	Total Hydrologic Score	6

3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED CROPLAND	2	2	2	2
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	YES	YES	YES	YES	YES
	Total Potential Contaminant Source/Land Use Score - Zone 1A	2	2	2	2
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	NO	0	0	0	0
(Score = # Sources X 2) 8 Points Maximum		0	0	0	0
Sources of Class II or III leacheable contaminants or	YES	4	0	0	
4 Points Maximum		4	0	0	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Greater Than 50% Irrigated Agricultural Land	4	4	4	4
	Total Potential Contaminant Source / Land Use Score - Zone 1B	8	4	4	4
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	Greater Than 50% Irrigated Agricultural Land	2	2	2	
	Potential Contaminant Source / Land Use Score - Zone II	5	5	5	0
Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	YES	1	1	1	
	Total Potential Contaminant Source / Land Use Score - Zone III	3	3	3	0
Cumulative Potential Contaminant / Land Use Score		18	14	14	6

	IOC	VOC	SOC	Microbial
4. Final Susceptibility Source Score	13	12	12	11
5. Final Well Ranking	High	High	High	High

1. System Construction

		SCORE
Intake structure properly constructed	NO	1
Is the water first collected from an underground source? Yes = collected water does not contact atmosphere; lower score No = water collected after it contacts atmosphere or unknown; higher score	YES	0
Total System Construction Score		1

2. Potential Contaminant / Land Use - ZONE 1A

		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	RANGELAND, WOODLAND, BASALT	0	0	0	0
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		0	0	0	0

Potential Contaminant / Land Use - ZONE 1B

		IOC Score	VOC Score	SOC Score	Microbial Score
Contaminant sources present (Number of Sources)	YES	0	0	0	0
(Score = # Sources X 2) 8 Points Maximum		0	0	0	0
Sources of Class II or III leacheable contaminants or	YES	0	0	0	
4 Points Maximum		0	0	0	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone 1B		0	0	0	0
Cumulative Potential Contaminant / Land Use Score		0	0	0	0

4. Final Susceptibility Source Score

	IOC	VOC	SOC	Microbial
4. Final Susceptibility Source Score	1	1	1	1
5. Final Spring Ranking	Low	Low	Low	Low